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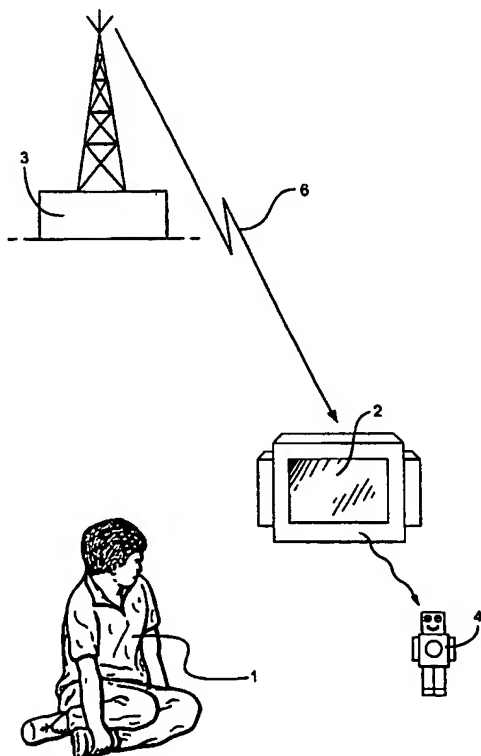
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(54) Title: IMPROVED INTERACTIVE COMMUNICATIONS APPARATUS AND METHOD



(57) Abstract: The present invention uses an acoustic data transmission system channel for communicating with remote items such as toys or other novelty devices. Control data is embedded in an acoustic which is broadcast to a toy. The data is received by the toy, which is in the vicinity of a receiver. Operation of the toy can be modified upon receipt of the embedded data. The receiver may be a television and the data broadcast with a television program.

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WO 01/33836 A1

## **IMPROVED INTERACTIVE COMMUNICATIONS APPARATUS AND METHOD**

The present invention relates to an improved interactive communications apparatus and method. More specifically, the present invention relates to an apparatus and a method for interacting with remote items such as toys, domestic appliances, or novelty devices via the unwanted electromagnetic radiation emitted from an electronic devices.

Television (TV) screens and Video Display Units (VDUs) are known to emit unwanted electromagnetic (EM) radiation, often referred to as noise. The noise can be due to the electronic components used to create an image or sound. It is known to use this noise to try and reconstruct the original image or sound.

Presently toys can be pre-programmed to perform certain tasks in response to a predefined signal. This signal may be an electrical or acoustic signal, or a physical signal such as pressure. For example, a doll may cry when it is squeezed or dance in response to music being played.

However, these types of toys have a limited range of responses and are not readily re-programmable. Furthermore, these toys are not capable of interacting with signals, for example, from a television (TV) broadcast.

It is an object of the present invention to encode this unwanted EM radiation with information broadcast from, for example, a TV station, which could then be downloaded to a device, such as a toy.

It is a further object of the present invention that this information is used to program or modify the operation of the device.

According to the present invention there is provided apparatus for communicating with a remote item, said apparatus comprising: a broadcast

means arranged to transmit a signal, said signal having data embedded therein; a receiver arranged to receive said signal and encode unwanted electromagnetic radiation emitted from said receiver with said data; and a further receiver disposed proximate said remote item and arranged to detect said unwanted electromagnetic radiation and interpret said data upon which control of said remote item may be modified.

Preferably, the data is transmitted via a video component of the signal. The signal may be an analogue signal or a digital signal.

The data may be a modulated signal. The broadcast means may be a television broadcast or a webcast. The receiver may be a television, radio, or satellite decoder. The unwanted electromagnetic radiation may be caused by electronic components in the receiver. The receiver may include a video display unit, liquid crystal display, or plasma display.

The remote item may be a toy, domestic appliance, mobile phone, or other novelty device.

The remote item may be programmed and/or reprogrammed by the data to display or playback promotional messages.

The data may be encrypted to prevent misuse.

The signal may include data which is used to reprogram the remote item for advertising purposes.

Furthermore, according to the present invention there is provided a method for communicating with a remote item, said method comprising the steps of transmitting data, receiving said transmitted data, encoding said received data into an unwanted electromagnetic signal, transmitting said encoded unwanted electromagnetic signal, receiving said encoded unwanted electromagnetic signal,

and interpreting said data encoded within said unwanted electromagnetic signal, upon which operation of said remote item may be modified.

Advantageously, the present invention requires no additional hardware to be attached to the receiver. Furthermore, the present invention works independent of the broadcast system.

Advantageously, the present invention can be used to reinforce educational or promotional messages.

While the principle advantages and features of the present invention have been described above, a greater understanding and appreciation of the present invention may be obtained by referring to the drawings and detailed description of the preferred embodiments, presented by way of example only, in which; Figure 1 is a diagram of the basic system, Figure 2 is a diagram of the transmission system, and Figure 3 is a diagram of the receiver system.

In Figure 1, the basic concept of the invention is shown, in which a child 1, for example, is shown watching a TV programme on a monitor 2 while accompanied by a remote item, such as toy robot 4. A broadcast station 3 is arranged to transmit a signal 6, which contains the TV programme that the child is watching. The TV program is received by and displayed on the monitor 2. In addition to an audio and visual component, the signal 6 also includes a data burst which contains information for controlling the toy robot 4.

The monitor 2 emits unwanted electromagnetic radiation which has been encoded to include the data transmitted with the signal 6 from the broadcast station. The data can be encoded in the unwanted electromagnetic radiation or noise by modulation techniques. The noise is received by the toy and the data interpreted. The operation of the toy can be modified in response the interpreted

data. The toy could then appear to interact with the programme reinforcing educational or promotional messages. It is also intended that the toy may be updated by new software to add new features, behaviours, or vocabulary via the same data path. This could be a major incentive for the child to watch the broadcast in consort with the toy.

In Figure 2 the basic transmission process 20 for the broadcast system is shown. The broadcast is preferably an analogue broadcast. The term analogue broadcast includes all PAL, NTSC and SECAM type broadcasts, FM and AM radio broadcast in HF, VHF and UHF bands, as well analogue satellite and cable systems. The audio content 21 of a program to be broadcast is transmitted as part of the baseband audio signal. Digital control data 25 for controlling a remote item, such as the toy robot shown in Figure 1, is encrypted by encryption means 26. The control data may be encrypted using either an asymmetric or symmetric encryption scheme. The data is then modulated by modulation means 27 onto a carrier using, for example, angle modulation such as FSK, PSK, DPSK or CPSK, pulse position modulation, or multi-dimensional modulation schemes. The modulated data is then amplified by amplifier 28 and then combined with the audio content 21 of the program by summation means 23. The carrier can either be a simple tone or a spread spectrum carrier such as frequency hopped, chirped, or direct sequence spread spectrum. Broadcast means 24 then transmits a signal 6, which is the combination of audio content 21 and digital control data 25, via broadcast antenna 29. As will be appreciated, broadcast means 24 may be a VHF or UHF television broadcast or an AM or FM radiobroadcast.

Figure 3 shows a diagram of a receiving system 30 used for receiving signal 6 broadcast from the transmission systems shown in figure 2 and for transforming signal 6 into the encoded unwanted electromagnetic signal 36

containing the information or data for controlling the remote item 4. The receiving system 30 comprises a domestic receiver 31 and a remote device receiver 32. The remote device receiver 32 must be located proximate the source of the encoded unwanted electromagnetic signal 36, which is preferably located in the domestic receiver 31. The domestic receiver is preferably part of a TV or a radio. The remote device receiver 32 must be located proximate the remote item to be controlled, and is preferably disposed on or within the remote item.

Operation of the receiving system is as follows. The domestic receiver 31 receives signal 6 via domestic antenna 33, demodulates the video component of signal 6 via demodulation means 34 and then generates a display on display means 45. The display means is preferably a television screen. The unwanted electromagnetic radiation 36 emitted by the television is received by the antenna 37 located within the device receiver 32 and is then amplified by amplification means 38 and demodulated by demodulation means 39. The demodulation means then regenerates the digital control data 25. The control data is then applied to decryption means 40 which in turn generates the intended control data 41 for use by the remote device.

In the above embodiment the intended remote device is a toy robot. The digital control data 41 could be communicated to a microcontroller and used to update programs stored in a local memory of the toy robot. Alternatively, the digital control data could be used to generate control signals for use by actuators on the toy and/or a voice synthesiser connected to loudspeaker 58. Furthermore, if the toy robot contains a local feedback feature, a child playing with the robot can be requested to move the robot to an area in which there is improved reception of encoded unwanted electromagnetic signal 36.

As will be appreciated, in order to maximise signal reception, various configurations of transmission and receiver system previously described can be utilised.

As will also be appreciated, the data capacity of the broadcast channel is equal to the achievable data rate multiplied by the time available to transmit the data. Using relatively low amounts of transmitted data, such as four to eight bytes, the information can be used to trigger built-in responses, such as triggering a sequence of actions or phrases. As the amount of data increases to approximately ten one hundred bytes, the information can be used to modify the built-in responses, add new phrases or action sequences, or to download new data for field programmable devices and microcontrollers.

Furthermore, while encryption of the control data is not required, it does help to prevent misuse of the broadcast channel. The need for encryption becomes more critical as the amount of data transmitted to the device increases. For example, triggering a pre-defined response would not require the same level of protection as a complete downloading of new data.

In a further embodiment of the present invention, a facility is provided for the broadcaster to restore factory settings by transmission of a reset code. Furthermore, a reset button could be included on the toy, which when pressed resets the toy to the factory settings.

As will be appreciated by those skilled in the art, various modifications may be made to the embodiment hereinbefore described without departing from the scope of the present invention.

## CLAIMS

1. Apparatus for communicating with a remote item, said apparatus comprising:
  - a broadcast means arranged to transmit a signal, said signal having data embedded therein;
  - a receiver arranged to receive said signal and encode unwanted electromagnetic radiation emitted from said receiver with said data; and
  - a further receiver disposed proximate said remote item and arranged to detect said unwanted electromagnetic radiation and interpret said data upon which control of said remote item may be modified.
2. Apparatus as claimed in Claim 1, wherein said data is transmitted via a video component of said signal.
3. Apparatus as claimed in any preceding claim, wherein said signal is an analogue signal.
4. Apparatus as claimed in any of Claims 1-2, wherein said signal is a digital signal.
5. Apparatus as claimed in any preceding claim, where said broadcast means includes means for encrypting said data.
6. Apparatus as claimed in Claim 5, wherein said further receiver includes means for decrypting said data.



7. Apparatus as claimed in any preceding claim, wherein said receiver is a television.

8. Apparatus as claimed in any preceding claim, wherein said data reprograms said remote item.

9. Apparatus as claimed in any preceding claim, wherein said data includes a code which upon reception by said remote item resets said remote item to a predefined program.

10. Apparatus as claimed in any preceding claim, wherein said remote item includes means for resetting said remote item to a predefined program.

11. Apparatus as claimed in any preceding claim, wherein said remote item is a toy.

12. Apparatus as claimed in any preceding Claim, wherein said data is a modulated signal

13. Apparatus as claimed in any preceding Claim, wherein said broadcast means is further arranged to modulate said data.

14. A method for communicating with a remote item, said method comprising the steps of:

transmitting data,

receiving said transmitted data,  
encoding said received data into an unwanted electromagnetic  
signal,  
transmitting said encoded unwanted electromagnetic signal,  
receiving said encoded unwanted electromagnetic signal, and  
interpreting said data encoded within said unwanted  
electromagnetic signal, upon which operation of said remote item  
may be modified.

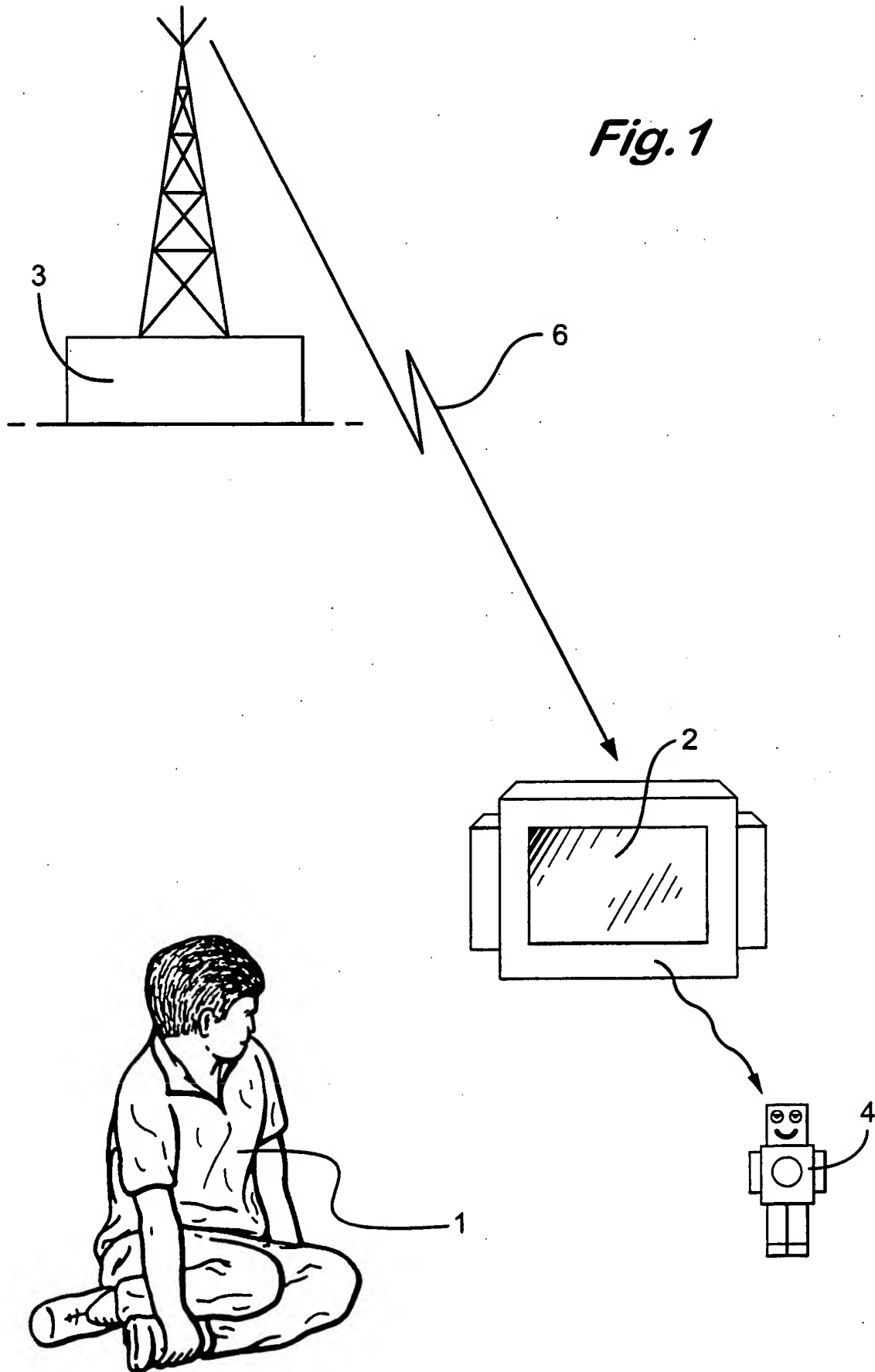
15. A method as claimed in Claim 14, further comprising the step of  
encrypting said data prior to said step of transmitting data, and decrypting said  
data prior to said step of interpreting said data.

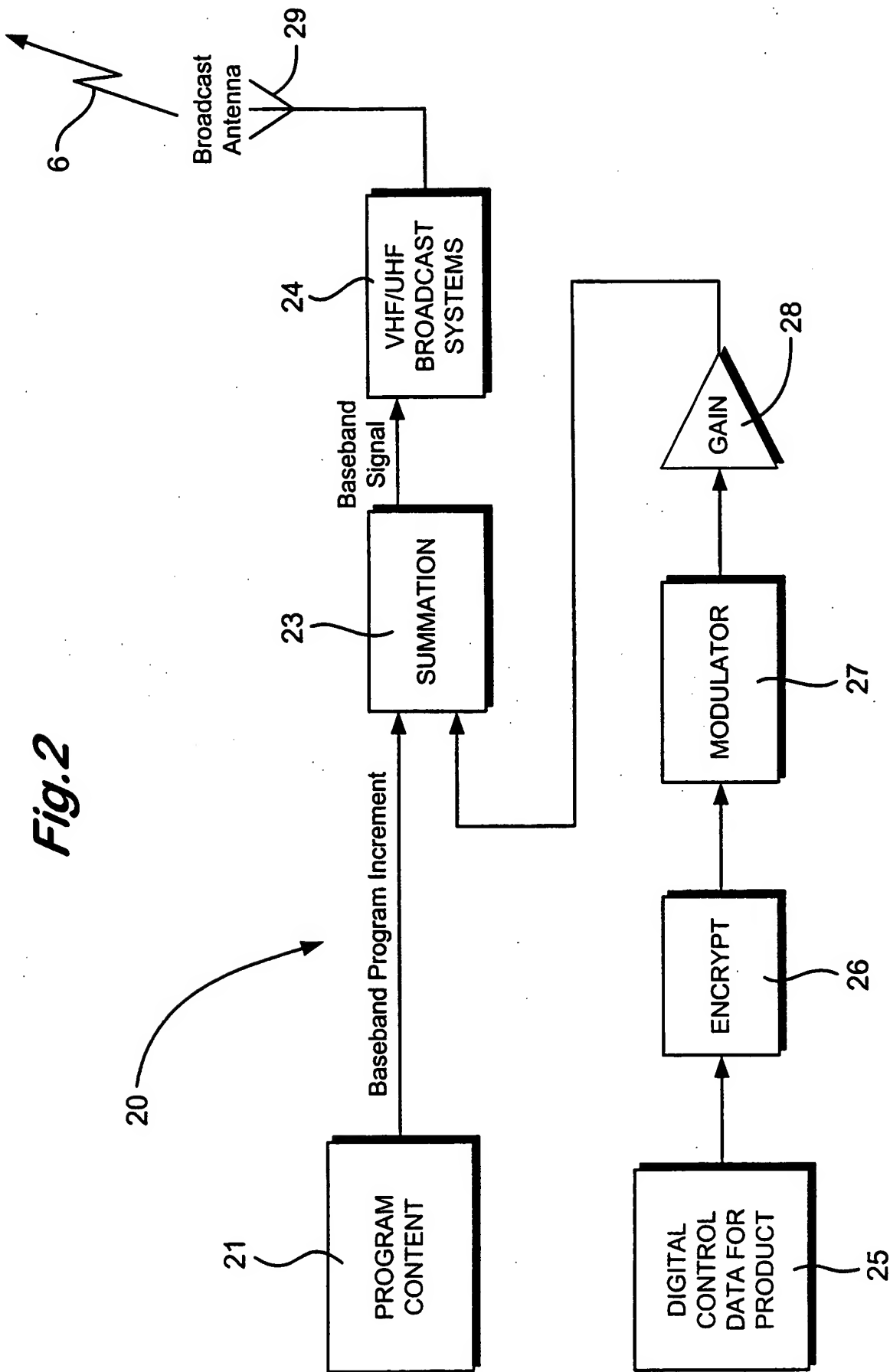
16. A method as claimed in Claims 14 or 15, wherein said data in  
transmitted via a video component of a broadcast.

17. A method as claimed in Claim 16, wherein said broadcast is a  
television broadcast

18. Apparatus for communicating with a remote item as hereinbefore  
described with reference to the accompanying figures.

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*Fig. 1*



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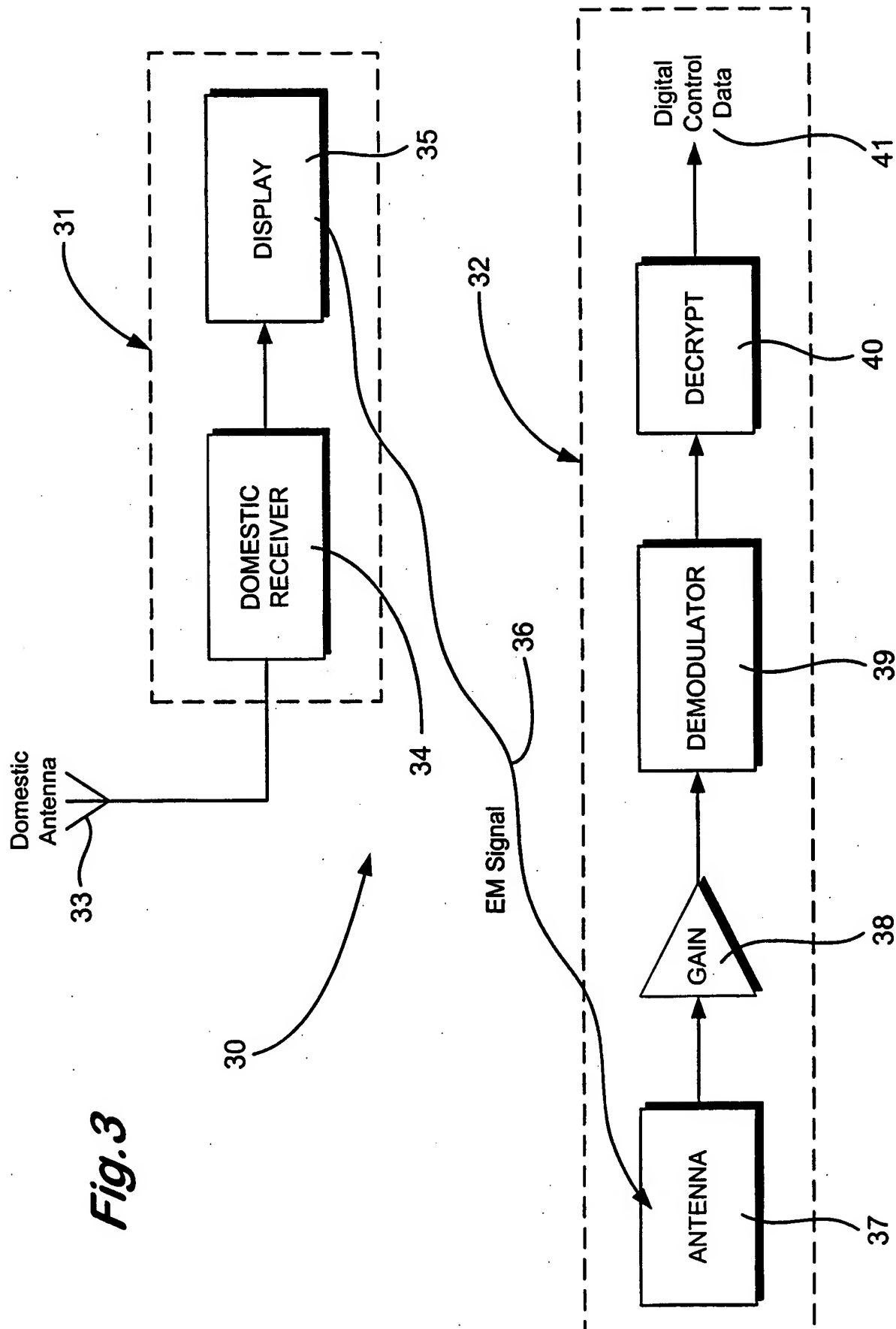


Fig. 3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/10408

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N5/44 H04N7/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 4 807 031 A (BROUGHTON ROBERT S ET AL) 21 February 1989 (1989-02-21)</p> <p>column 1, line 7-12 column 2, line 37 - line 50 column 17, line 43 - line 52</p>	<p>1-3,7,8, 11-14, 16-18</p>

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Further documents are listed in the continuation of box C.

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Patent family members are listed in annex.

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Information on patent family members

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